

# PHYSICAL VS. CHEMICAL PROPERTIES

Name \_\_\_\_\_

A physical property is observed with the senses and can be determined without destroying the object. For example, color, shape, mass, length and odor are all examples of physical properties.

A chemical property indicates how a substance reacts with something else. The original substance is fundamentally changed in observing a chemical property. For example, the ability of iron to rust is a chemical property. The iron has reacted with oxygen, and the original iron metal is changed. It now exists as iron oxide, a different substance.

Classify the following properties as either chemical or physical by putting a check in the appropriate column.

	Physical Property	Chemical Property
1. blue color		
2. density		
3. flammability		
4. solubility		
5. reacts with acid to form $H_2$		
6. supports combustion		
7. sour taste		
8. melting point		
9. reacts with water to form a gas		
10. reacts with a base to form water		
11. hardness		
12. boiling point		
13. can neutralize a base		
14. luster		
15. odor		

# PHYSICAL VS. CHEMICAL CHANGES

Name \_\_\_\_\_

In a physical change, the original substance still exists, it has only changed in form. In a chemical change, a new substance is produced. Energy changes always accompany chemical changes.

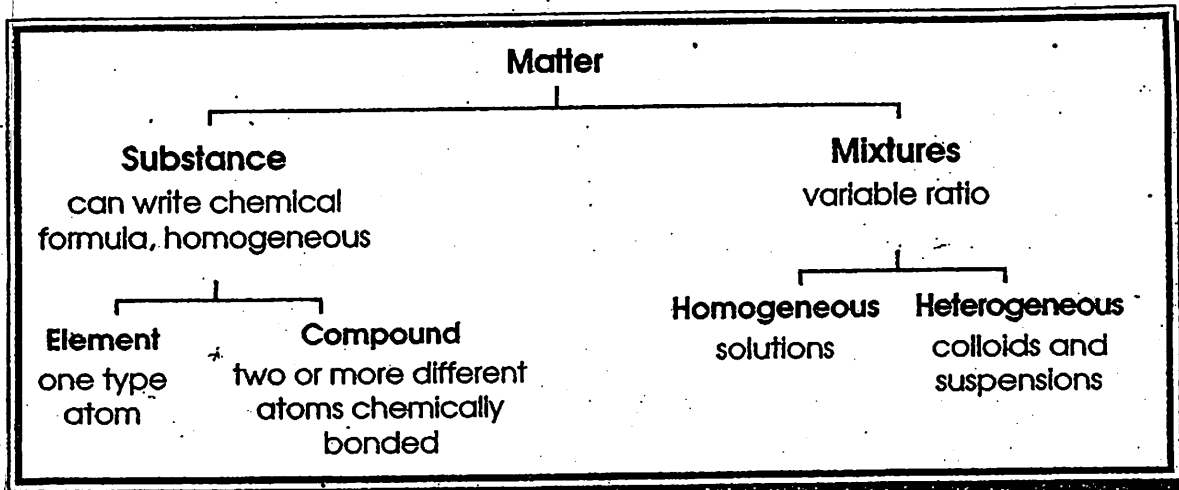
Classify the following as being a physical or chemical change.

1. Sodium hydroxide dissolves in water. \_\_\_\_\_
2. Hydrochloric acid reacts with potassium hydroxide to produce a salt, water and heat. \_\_\_\_\_
3. A pellet of sodium is sliced in two. \_\_\_\_\_
4. Water is heated and changed to steam. \_\_\_\_\_
5. Potassium chlorate decomposes to potassium chloride and oxygen gas.  
\_\_\_\_\_
6. Iron rusts. \_\_\_\_\_
7. When placed in  $H_2O$ , a sodium pellet catches on fire as hydrogen gas is liberated and sodium hydroxide forms. \_\_\_\_\_
8. Evaporation \_\_\_\_\_
9. Ice melting \_\_\_\_\_
10. Milk sours. \_\_\_\_\_
11. Sugar dissolves in water. \_\_\_\_\_
12. Wood rotting \_\_\_\_\_
13. Pancakes cooking on a griddle \_\_\_\_\_
14. Grass growing in a lawn \_\_\_\_\_
15. A tire is inflated with air. \_\_\_\_\_
16. Food is digested in the stomach. \_\_\_\_\_
17. Water is absorbed by a paper towel. \_\_\_\_\_

# MATTER—SUBSTANCES VS. MIXTURES

Name \_\_\_\_\_

All matter can be classified as either a substance (element or compound) or a mixture (heterogeneous or homogeneous).



Classify each of the following as to whether it is a substance or a mixture. If it is a substance, write Element or Compound in the substance column. If it is a mixture, write Heterogeneous or Homogeneous in the mixture column.

Type of Matter	Substance	Mixture
1. chlorine		
2. water		
3. soil		
4. sugar water		
5. oxygen		
6. carbon dioxide		
7. rocky road ice cream		
8. alcohol		
9. pure air		
10. iron		

## CHAPTER 1 REVIEW

### Matter and Change

#### SECTION 1-2

**SHORT ANSWER** Answer the following questions in the space provided.

1. Classify each of the following as a *homogeneous* or *heterogeneous* substance:

- \_\_\_\_\_ a. iron ore
- \_\_\_\_\_ b. quartz
- \_\_\_\_\_ c. granite
- \_\_\_\_\_ d. soft drink
- \_\_\_\_\_ e. milk
- \_\_\_\_\_ f. salt
- \_\_\_\_\_ g. water
- \_\_\_\_\_ h. nitrogen

2. Classify each of the following as a *physical* or *chemical* change:

- \_\_\_\_\_ a. ice melting
- \_\_\_\_\_ b. paper burning
- \_\_\_\_\_ c. metal rusting
- \_\_\_\_\_ d. gas under pressure
- \_\_\_\_\_ e. liquid evaporating
- \_\_\_\_\_ f. food digesting

3. Compare a physical change with a chemical change.

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#### SECTION 1-2 continued

4. Compare and contrast each of the following terms:

a. *mass* and *matter*

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b. *atom* and *compound*

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c. *physical property* and *chemical property*

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d. *homogeneous mixture* and *heterogeneous mixture*

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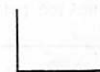
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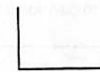
5. Draw a diagram that compares the arrangement of atoms in the solid, liquid, and gas state.



Solid



Liquid



Gas

6. How is energy involved in chemical and physical changes?

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## CHAPTER 1 REVIEW

### *Matter and Change*

#### SECTION 1-3

**SHORT ANSWER** Answer the following questions in the space provided.

1. A horizontal row of elements in the periodic table is called a(n) \_\_\_\_\_
2. The symbol for the element in Period 2, Group 13, is \_\_\_\_\_
3. Elements that are good conductors of heat and electricity are \_\_\_\_\_
4. Elements that are poor conductors of heat and electricity are \_\_\_\_\_
5. A vertical row of elements in the periodic table is called a(n) \_\_\_\_\_
6. The ability of a substance to be hammered or rolled into thin sheets is called \_\_\_\_\_
7. Would an element that is soft and able to be cut with a knife likely be a metal or a nonmetal? \_\_\_\_\_
8. Group 18 elements, which are generally unreactive, are called \_\_\_\_\_
9. At room temperature, most metals are \_\_\_\_\_
10. Name three characteristics of most nonmetals.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
11. Name three characteristics of metals.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
12. Name three characteristics of most metalloids.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
13. Name two characteristics of noble gases.  
\_\_\_\_\_  
\_\_\_\_\_

#### SECTION 1-3 continued

14. What do elements of the same group in the periodic table have in common?

\_\_\_\_\_  
\_\_\_\_\_

15. What do elements of the same period in the periodic table have in common?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

16. You are trying to manufacture a new material, but you would like to replace one of the elements in your new substance with another element that has similar chemical properties. How would you use the periodic table to choose a likely substitute?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

17. What is the difference between a family of elements and elements in the same period?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

18. Complete the table below by filling in the spaces with correct names or symbols.

Name of element	Symbol of element
Aluminum	
	Ca
	Mn
Nickel	
Phosphorus	
Cobalt	
	Si
	H

## CHAPTER 1 REVIEW

### Matter and Change

#### MIXED REVIEW

**SHORT ANSWER** Answer the following questions in the space provided.

1. Classify each of the following as a *homogeneous* or *heterogeneous* substance:

- |                       |                  |
|-----------------------|------------------|
| _____ a. sugar        | _____ d. plastic |
| _____ b. iron filings | _____ e. cement  |
| _____ c. milk         |                  |

2. Select the most appropriate branch of chemistry from the following choices to best describe each of the investigations: organic chemistry, analytical chemistry, biochemistry, theoretical chemistry.

- |   |
|---|
| _____ a. A forensic scientist uses chemistry to find information at the scene of a crime. |
| _____ b. A scientist uses a computer model to see how an enzyme will function.            |
| _____ c. A professor explores the reactions that take place in a human liver.             |
| _____ d. An oil company scientist tries to design a better gasoline.                      |
| _____ e. An anthropologist tries to find out the nature of a substance in a mummy's wrap. |
| _____ f. A pharmaceutical company examines the protein on the coating of a virus.         |

X For each of the following types of chemical investigations, determine whether the investigation is basic research, applied research, or technological development.

- |   |
|---|
| _____ a. A university plans to map all the genes on human chromosomes.                      |
| _____ b. A research team intends to find out why a lake remains polluted.                   |
| _____ c. A science teacher looks for a paint that will allow graffiti to be easily removed. |
| _____ d. A cancer research institute explores the chemistry of the cell.                    |
| _____ e. A professor explores the toxic compounds in marine animals.                        |

#### MIXED REVIEW continued

4. Use the periodic table to identify the name, group number, and period number of the following elements: *Also Type of element*

- |             |
|-------------|
| _____ a. Cl |
| _____ b. Mg |
| _____ c. W  |
| _____ d. Fe |
| _____ e. Sn |

5. What is the difference between extensive and intensive properties?

\_\_\_\_\_

\_\_\_\_\_

6. Consider the burning of gasoline and the evaporation of gasoline. Which process represents a chemical change and which represents a physical change? Give a reason for your answer.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Describe the difference between a heterogeneous mixture and a homogeneous mixture, and give an example of each.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. Construct a concept map that includes the following terms: atom, element, compound, pure substance, mixture, homogeneous, and heterogeneous.

*(flow chart)*